

Remarks

Claims 1, 7, 23-27, 30-34, 37, 39, 41-49, 51, 52, 57-65 are currently pending. Claims 1, 23, 26, 27, 30-34, 37, 39, 41- 43, 57, 58 and 60-65 have been amended. Claims 22 and 29 have been canceled. Support for the claim amendments can be found throughout the application as filed. Therefore, no new matter has been added. Favorable reconsideration is respectfully requested in view of the foregoing amendments and following remarks.

Claim Rejections – 35 USC § 112¶2

Claims 1, 7, 22-27, 29-34, 37, 39, 41-49, 51-52, and 57-65 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite. The Examiner states that the rejected claims fail to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention.

The Applicants respectfully remind the Examiner that “clarity and precision” are the touchstones of compliance with the requirement for definiteness. See MPEP § 2173.02. Further, the Examiner is obliged to allow otherwise patentable claims if the “subject matter is claimed with a reasonable degree of particularity and distinctness.” See MPEP § 2173.02 (excerpt reproduced below).

The examiner's focus during examination of claims for compliance with the requirement for definiteness of 35 U.S.C. 112, second paragraph, is whether the claim meets the threshold requirements of clarity and precision, not whether more suitable language or modes of expression are available. When the examiner is satisfied that patentable subject matter is disclosed, and it is apparent to the examiner that the claims are directed to such patentable subject matter, he or she should allow claims which define the patentable subject matter with a reasonable degree of particularity and distinctness. Some latitude in the manner of expression and the aptness of terms should be permitted even though the claim language is not as precise as the examiner might desire. Examiners are encouraged to suggest claim language to applicants to improve the clarity or precision of the language used, but should not reject claims or insist on their own preferences if other modes of expression selected by applicants satisfy the statutory requirement. MPEP § 2173.02.

Regarding claims 1, 27, 43 and 58

Claims 1, 27, 43 and 58 have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite. The Examiner asserts that the phrase “a quaternary ammonium, phosphonium or sulfonium cation” is indefinite because there are no definitive chemical structures associated with the use of the aforementioned phrase. The Applicants have amended the claims to specify the identity of the cation with greater particularity. The language added to the claims appeared in the claims as originally filed; therefore, no new matter has been added.

Regarding claims 1 and 27

Additionally, in claims 1 and 27, the Examiner asserts that the phrase “R₁ and R₂ may be taken together to form a ring” is vague. The Applicants have amended claims 1 and 27 to specify that the ring formed by R₁ and R₂ is a 5-7 membered carbocyclic ring. Support for this amendment can be found at page 6, paragraph [0020] of the Specification as originally filed.

Regarding claim 43

The Examiner contends that the phrase “carbon-containing group” in claim 43 is vague and indefinite. The Applicants have amended claim 43 to reflect the specific carbon-containing groups explicitly cited on page 6, paragraph [0023] of the Specification as originally filed.

As the remaining claims depend, directly or indirectly, from the claims specifically listed above, the Applicants respectfully contend that all of the rejected claims are definite. Consequently, the Applicants respectfully contend that the rejected claims in the instant application comply with the requirements of 35 USC 112¶2.

Claim Rejections – 35 USC § 103(a)

Claims 1, 7, 22, 24, 27, 29, 31, 34, 37, 39, 41-42, 51, 57, and 60-65 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kaneko et al. (JP08-030013). The Applicants respectfully traverse.

To establish a *prima facie* case of obviousness, a number of criteria must be met. For example, all of the limitations of a rejected claim must be taught or suggested in the references relied upon by the Examiner; or they must be among the variations that would have been “obvious to try” to one of ordinary skill in the relevant art in light of the cited references.

Moreover, one of ordinary skill in the relevant art must have a reasonable expectation of success in light of the cited reference(s). Importantly, the reasonable expectation of success must be found in the prior art, and may not be based on the Applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 U.S.P.Q. 2d 1438 (Fed. Cir. 1991); see MPEP § 2143 - § 2143.03 for decisions pertinent to each of these criteria.

Kaneko is nonanalogous art

Kaneko describes a method of recording and removing images from a substrate. Therefore, the reference is nonanalogous art vis-à-vis the claimed ionic liquid compositions because the reference advanced by the Examiner does not relate to "any need or problem known in the field of [ionic liquids] at the time of the invention and addressed by" the instant application. See MPEP § 2141.01(a). Furthermore, while not dispositive of an assessment of analogy, the Applicants note that Kaneko has been assigned to Int. Cl. G03G "Electrography; Electrophotography; Magnetography," subclasses 7/00 "Selection of materials for use in image-receiving members, i.e. for reversal by physical contact; Manufacture thereof" and 21/00 "Arrangements not provided for by groups 13/00 to 19/00, e.g. cleaning, elimination of residual charge." In stark contrast, the present application has been assigned to Int. Cl. C07C "Acyclic or carbocyclic compounds," subclass 39/44 "Metal derivatives of a hydroxy group bound to a carbon atom of a six-membered aromatic ring." The Patent Office classification of references can and does, in this case, provide some evidence of "nonanalogy." See MPEP § 2141.01(a).

Further, an assessment of the similarities and differences in structure and function of the claimed invention and the teachings of the cited reference should carry even greater weight in establishing the "nonanalogy" of the cited reference. MPEP § 2141.01(a). The structural differences between the image removal liquid described in Kaneko and the compositions of the present invention are significant. Specifically, one of ordinary skill in the art would understand that having "water as the base as a principal component" (Kaneko, paragraph [0008]) would entail having more water present in the solution than any other single component. In contrast, rejected claim 1 states that the ionic liquid must be present in at least 70% by weight of the composition. This leaves at most 30% water by weight in the claimed compositions. Even if one assumes that the composition comprises no other components, the maximum amount of water (30%) would not be considered by one of

ordinary skill in the art to be the “principal component” of the claimed compositions. Additionally, the function of the claimed invention differs from that of the compositions cited in Kaneko. The problem addressed in Kaneko is that of providing an improved method and device for regenerating a material to be recorded. In contrast, the problem addressed in the present application is the discovery and manufacture of new ionic liquid compositions with water as a minority if not incidental constituent. Importantly, Kaneko stresses the importance of the presence of water in order to carry out the specific function of the image removal accelerating liquid. The requirement for lesser amounts of water in the claimed ionic liquid compositions would discourage one of skill in the art of ionic liquids from looking to Kaneko for guidance as to how to make and use the subject matter of the rejected claims.

Therefore, the Applicants respectfully contend that Kaneko is not available to the Examiner because it does not relate to analogous art. In the absence of Kaneko, the Applicants respectfully contend that the Examiner has failed to state a *prima facie* case of obviousness for the pending claims.

Kaneko does not teach or render obvious to try each and every element of the claimed invention

Assuming *arguendo* that Kaneko is available as an analogous prior art reference, which the Applicants do not believe to be the case, the Applicants contend that Kaneko does not teach all of the limitations of rejected claim 1, and the claims dependent therefrom.

The Applicants point out that claims 22 and 29 have been canceled, thus rendering moot the rejection of these claims.

One of ordinary skill in the art would understand Kaneko’s explicit requirement for having “water as the base as a principal component” would entail having more water present in the solution than any other single component. Claim 1 clearly states that the ionic liquid must be present in at least 70% by weight of the composition. This limitation leaves at most 30% water by weight in the claimed compositions. Assuming that no other components of the composition are present, the maximum amount of water (30%) that could be present would not be considered by one of ordinary skill in the art to be a “principal component” of the claimed compositions. Therefore, Kaneko explicit requirement for water as the principal component renders it lacking with respect the literal scope of the rejected claims. Moreover,

because Kaneko explicitly requires that water must be the principal component of its compositions, one of ordinary skill in the art would not consider it “obvious to try” modifying Kaneko’s compositions to include no more than 30% water.

Furthermore, claim 1 is directed to an ionic liquid comprising heteroaromatic cations; or quaternary ammonium cations substituted by groups selected from the group consisting of from about six to about eighteen carbon atoms or aryl groups; or 1-butyl-3-methylimidazolium; or cations selected from the group consisting of tetrabutyl ammonium, tributylmethyl ammonium, tetrabutyl phosphonium, tetraethyl ammonium, N,N-dialkyl pyrrolidinium, trimethyl-2-hydroxyethyl ammonium, N,N'-dialkyl imidazolium, N-alkylpyridinium, and a mixture thereof. Kaneko does not teach or suggest these cations. Kaneko teaches only cations of formula (2), wherein the R₃, R₄, R₅, and R₆ substituents on nitrogen are “hydrogen, an alkyl group of carbon numbers 1-4, a hydroxyalkyl group, [or] an alkyl halide group.”

Claim 24 is directed to an ionic liquid comprising quaternary ammonium cations substituted by groups selected from the group consisting of alkyl consisting of from about six to about eighteen carbon atoms and aryl groups. Kaneko does not teach or suggest these cations. Kaneko teaches only cations of formula (2), wherein the R₃, R₄, R₅, and R₆ substituents on nitrogen are “hydrogen, an alkyl group of carbon numbers 1-4, a hydroxyalkyl group, [or] an alkyl halide group.” Tetrabutylammonium (R = C₄H₉) hydroxide, for example, is a well-known phase transfer catalyst, indicating the amphiphilic nature of the molecule even with lower alkyl substitution. Because the image removal accelerating liquid of Kaneko contains water as its principal component, increasing the number of carbon atoms in the alkyl substituents of the cation would not have been an obvious variation to one of ordinary skill in the art, as the solubility of such cations in water would decrease significantly.

Claim 27 is directed to a hydrophobic ionic liquid composition comprising greater than 70 weight percent of an ionic liquid. Kaneko stresses the importance of the presence of water in the image removal promotion liquids described in JP08-030013. Paragraph [0008] of Kaneko describes the solutions as “[using] water as the base as a principal component.” One of ordinary skill in the relevant art would know, or be able to deduce, that a

“hydrophobic ionic liquid” of the present invention would not form a solution having water as the principal component. Furthermore, Kaneko describes the “sulfo succinate” moieties as “surfactants” [paragraph 0008]. It is well-understood by those of ordinary skill in the art that while surfactants, by definition, contain a hydrophobic region, they are not themselves “hydrophobic,” as the present claims require.

Claim 31 is directed to a hydrophobic ionic liquid comprising quaternary ammonium cations substituted by groups selected from the group consisting of alkyl consisting of from about six to about eighteen carbon atoms and aryl groups. Kaneko does not teach or suggest these cations. Kaneko teaches only cations of formula (2), wherein the R₃, R₄, R₅, and R₆ substituents on nitrogen are “hydrogen, an alkyl group of carbon numbers 1-4, a hydroxyalkyl group, [or] an alkyl halide group.” Tetrabutylammonium (R = C₄H₉) hydroxide, for example, is a well-known phase transfer catalyst, indicating the amphiphilic nature of the molecule even with lower alkyl substitution. Because the image removal accelerating liquid of Kaneko contains water as its principal component, increasing the number of carbon atoms in the alkyl substituents of the cation would not have been an obvious variation to one of ordinary skill in the art, as the solubility of such cations in water would decrease significantly.

Also, claim 51 is directed to a molten salt. Kaneko teaches solutions of ions in water; Kaneko does not teach the molten form of a salt, regardless of the melting point.

Moreover, claim 57 is directed to an ionic liquid that melts at a temperature range that is greater than about 40 °C but less than about 80 °C. Kaneko teaches solutions of ions in water; Kaneko does not teach the molten form of a salt, regardless of the melting point.

Furthermore, claim 60 is directed to a composition comprising greater than 80 weight percent of the ionic liquid. The arguments made above pertaining to the effect of having at least 70 percent by weight of the ionic liquid are reiterated by reference. One of ordinary skill in the art would understand that having “water as the base as a principal component” would entail having more water present in the solution than any other single component. Claim 60 clearly states that the ionic liquid must be present in at least 80% by weight of the composition. This limitation allows for at most 20% water by weight in the claimed compositions. Assuming that no other components of the composition are present, 20%

water would not be considered by one of ordinary skill in the art to render water a “principal component” of the compositions. Kaneko, therefore, does not teach or render obvious to try each and every element of claims 1, 7, 22, 24, 27, 29, 31, 34, 37, 39, 41-42, 51, 57, and 60-65.

Kaneko does not provide a reasonable expectation of success

As noted above, in order to state a *prima facie* case of obviousness one of ordinary skill in the relevant art must have a reasonable expectation of success in light of the cited reference(s). Importantly, the reasonable expectation of success must be found in the prior art, and may not be based on the Applicant’s disclosure.

The many differences between a solution of ions and an ionic liquid are appreciated by one of ordinary skill in the art. For example, one of ordinary skill in the art appreciates that the mere existence of an aqueous solution of two particular ions does not guarantee that the two particular ions in their neat form will display the uncommon properties that render a salt an ionic liquid. For example, a room-temperature solution of sodium chloride in water does not provide a reasonable expectation of success in preparing a room-temperature sodium chloride-based ionic liquid; one of ordinary skill in the art can appreciate this fact because sodium chloride is “table salt” and there is no such room-temperature ionic liquid reported in the scientific literature.

Further, one of ordinary skill in the art would understand Kaneko’s statement that having “water as the base as a principal component” (paragraph [0008]) would entail having more water present in the solution than any other single component. Kaneko repeatedly stresses the importance of water in the composition – “the image removal promotion liquid containing alkyl sulfo succinate has the *high wettability* to the image formation matter and a recorded material, *osmosis* in a recorded material arises promptly and one of the reasons alkyl sulfo succinate gives the removal property of the good image formation matter is guessed for image removal promotion liquid to permeate even the interface of the image formation matter and a recorded material especially” (paragraph [0013], emphasis added). Furthermore, “when giving the image removal promotion liquid *with which water is especially contained...* to the recorded material in large quantities, ... the component of the image removal promotion liquid given to the recorded material, *especially water*[.] weaken[s] the adhesive strength of [the] recorded material and the image formation

matter...” (paragraph [0013], emphasis added). However, Applicants’ claims clearly state that the ionic liquid must be present in at least 70% by weight of the composition. Kaneko teaches away from the reduction of the quantity of water by stressing its importance in the compositions. It is well understood that the function of the compositions recited in Kaneko would change significantly were the quantity of water to be decreased. Accordingly, the Applicants respectfully contend that one of ordinary skill in the art would not have had a reasonable expectation of success in developing the claimed invention based on the teachings of Kaneko.

Consequently, the Applicants respectfully submit that the Examiner has failed to state a *prima facie* case of obviousness for the rejected claims. Withdrawal of the rejection of claims 1, 7, 22, 24, 27, 29, 31, 34, 37, 39, 41-42, 51, 57, and 60-65 is respectfully requested.

Fees

The Applicants believe that no fees that are due in connection with the filing of this Response. Nevertheless, the Commissioner is hereby authorized to charge any fees due in connection with the filing of this Response to our Deposit Account, **No. 06-1448**, reference **SAX-008.01**.

Conclusion

The Applicants believe that the pending claims are in condition for allowance. If a telephone conversation with Applicants' Agent would expedite prosecution of the above-identified application, the Examiner is urged to contact the undersigned.

Respectfully submitted,
Foley Hoag LLP

155 Seaport Boulevard
Boston, MA 02210

Telephone: (617) 832-1000
Telecopier: (617) 832-7000

Date: July 21, 2009

By: /Sharon M. Walker/
Sharon M. Walker, Ph.D.
Reg. No. 63,171
Agent for Applicants